

Socially Designed: South Lake Union Elementary

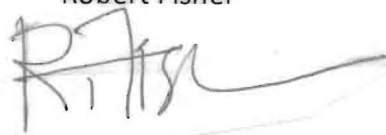
An Honors Thesis (ARCH 401)

By

Ryan D. Anderson

Thesis Advisor

Robert Fisher

A handwritten signature in dark ink, appearing to read 'R. Fisher', with a long horizontal flourish extending to the right. The signature is written over a faint horizontal line.

Ball State University
Muncie, Indiana

November 2010

Expected Date of Graduation

May 2011

Spokane
Undergrad
Thesis
LD
2489
.Z4
2011
.A53

Abstract

South Lake Union Elementary is a design proposal situated on the northern outskirts of downtown Seattle, Washington. The school was designed with the concept of promoting social interaction between students, teachers, and the larger community in which they exist. The building seeks to influence the social interactions of the user through the design of the built environment. By providing spaces for the public, showcasing activity and successfully designing flexible, multi-use space South Lake Union Elementary fosters communication and collaboration amongst its users. The new public school is intended to be a model for the rapidly developing community through its environmentally responsible, and socially inclined design solution.

Acknowledgments

I would like to thank Robert Fisher for his advice and guidance throughout the duration of this challenging and engaging project.

I would like to thank Courtney, Dru, Fiona, and Sean for their continued support and encouragement throughout the design process.

Table of Contents

Author's Statement – 1

Works Cited - 11

Appendix A – Presentation Graphics - 12

Appendix B – Model Photos - 21

Author's Statement

For my honors thesis I have decided to continue work on a design begun in Arch 401 for both the AIAS Kawneer Competition and a Ball State competition sponsored and funded by Cripe Architects. The design competition was entitled "School of Tomorrow" with the intention of producing innovative elementary school designs for the future. One of the primary targets of the competition was to achieve a high LEED (Leadership and Energy in Environmental Design) standard of sustainability as green design is now a vital element of architecture. In my personal view, sustainability is not just about the environment but also about the people and communities that use designed environments. That being said, I have tried to push my design to be both environmentally and socially sustainable.

Precedent Studies

In the study of architecture and design, precedents can be invaluable. The experiences and insights of those who have previously attempted to tackle the challenging issues that face us in the present can only advance designs solutions yet to come. In my years of design education I have been exposed to many architectural firms and different schools of thought. Of the firms I have encountered, Behnisch Architekten is perhaps the most influential. Behnisch Architekten is an internationally recognized firm with offices in Germany and the United States, whose work I have found to be both socially and environmentally successful. Both of these architectural attributes are essential to the success of a "school of tomorrow" and for these reasons I have chosen to investigate the work of Behnisch Architekten as case studies for my own design of the South Lake Union Elementary school.

"Architecture very literally has the capacity to build places that encourage social interaction. This is what the buildings of Behnisch Architekten do. What's more, that they don't require sophistic explanations because they are intuitively understood and used" (Jaeger 7). The social, "democratic" architecture of Behnisch is something that I have found inspiring and something that I feel is appropriate in the design of a major community school. In working through my own design scheme I studied Behnisch Architekten's Terrence Donnelly Centre, and the Genzyme Center to better understand how environmental and social principles can be successfully implemented in architecture. Although neither case study building is a school, both strive to create communicative, socially engaging, environmentally responsive, and user friendly spaces.

Terrence Donnelly Centre for Cellular and Bio-Molecular Research – Toronto, CDN

The Terrence Donnelly Centre is world class research facility located on the University of Toronto campus in Toronto, Ontario, Canada. The building, which houses laboratories, seminar rooms, lounges, offices, and a cafeteria, is nestled in amongst several historic buildings on the university campus. The siting of the centre creates a situation in which the building must respond not only to its own intended users, but also to the users of the neighboring buildings and those who frequently pass through this area of the campus. (Jaeger).The solution devised to meet such requirements was to create a building which lifted the laboratories up into the air and allowed the lower two levels to feature public spaces.

The deliberate design of public on the lower levels allows the building to serve the adjacent buildings that connect to it. Public space on the ground level also creates an atmosphere that is welcoming to all and unlike some research facilities, is not an intimidating space to enter. These open, public spaces are ideal for relaxed meetings for students and scientists alike.

Above the relatively public lower two levels there are ten laboratory levels dedicated to research and study. In the design of these levels, the architects continued to create open and communicative spaces. Stairs and double story lounges, which include garden areas, offer opportunities for users to spontaneously meet and discuss. The inclusion of nature in the building generates a positive and pleasant atmosphere that is conducive to study.

As with most of their work, this Behnisch design incorporates many sustainable principles including ample daylighting and a double skin façade. The reasonably thin floor plan allows for plenty of daylight to penetrate the working spaces and in turn reduces energy needs. Likewise, the use of a double skin façade system provides the building with a thermal barrier which helps to regulate building temperatures.

One of the most striking features of the building is its appearance at night. The glass tower stands out completely from the much shorter, heavy, brick buildings surrounding it. The interior walls are painted a variety of bright, highly visible colors, which create a vibrant display and offer some clue as to the functions on the interior. In some ways, the colors of the façade act as a diagram, illustrating function to passersby.

The Genzyme Center – Cambridge, Massachusetts

Like the Terrence Donnelly Centre, this research facility was designed to create a positive and collaborative workspace. Additionally, the Genzyme Center employs numerous sustainable design practices - so many in fact that the building has achieved LEED Platinum rating.

The primary organizational element as well as a major environment tool is the building's signature 12 story atrium. In addition to flooding the interior with daylight, the atrium serves to visually connect workspaces on all levels. Behnisch refers to this a vertical "boulevard". "Beginning on the ground floor between trees and water basins, a 'boulevard' extends up to the twelfth floors, via stairs, garden terraces, and galleries, connecting individual areas, neighborhoods and groups of spaces with the collectively used functions" (Jaeger 103). Visual connectivity as well as easy access between floors is vital in creating communicative environments.

The idea of indoor winter gardens is not an idea unique to Behnisch Architekten but it is a concept that they carry out particularly well. Throughout the boulevard that extends vertically through the building are a series of garden spaces that correspond with lounge and meeting areas. These breakout spaces offer an easy escape from desks and cubicles and enhance the overall atmosphere of the building.

To earn the LEED Platinum rating Behnisch needed to use a great deal of creativity to incorporate sustainable systems into the architecture. Daylighting is perhaps the most noticeable environmental attribute of the building as it is dealt with in a variety of ways. First off is the large atrium. Essentially a gigantic hole in the ceiling, the atrium allows in a fantastic amount of light. However this light is regulated and distributed throughout the building using several different tools such as a light wall made of adjustable panels and a large light chandelier that reflects light deep into the interior.

Another environmental tool that appears in the Genzyme Center as in the Terrence Donnelly Centre is the double skin façade. In the case of the Genzyme Center, the double façade system is utilized much more extensively. The system uses a 1.20 meter gap that insulates the building and can act as a sort of greenhouse if desired (Jaeger 103). The double skin systems, as well as the atrium, serve as a passive ventilation system for the entire building. As air heats up within the skin it rises and is released

from vents at the top allowing air from interior spaces to be drawn into the skin thus changing the air in the space. The atrium works with stack effect, as hot air simply rises and is exhausted out vents at the top, pulling new fresh air in from the bottom.

The Design – South Lake Union Elementary - South Lake Union, Seattle, Washington

The first step in the design process for this project was selecting an appropriate site. Each student was allowed to choose his or her own site anywhere in the country. It was expected that the chosen site would serve a community that was in need of a school now or sometime in the near future. In selecting my site I was looking for some place urban and some place compact that would in turn challenge my design skills.

The site of my school is South Lake Union, a community on the outskirts of downtown Seattle. South Lake Union is a rapidly developing community that is expected to add a significant number of residents in the next few years and therefore will probably need a school to serve the new community members. The site was chosen during a CAP fieldtrip to Seattle where I was able to see that the South Lake Union site was both urban and adequately challenging in nature.

The site, currently vacant, is bound on all four sides by streets with moderate to heavy traffic. Immediately across Valley Street to the north is a recently constructed park and Lake Union. This adjacency was particularly inviting as it offered an opportunity to open an urban school out into nature. To the south the site is bound by Mercer Street. Under the current Mercer Corridor Plan, Mercer Street is being widened to six lanes and a median, creating noise and pedestrian traffic concerns. Despite vehicular traffic issues the site has great access to public transportation as trolleys and buses both have several stops close to the site.

In choosing the South Lake Union site I was aware of challenges such as square footage requirements, pollution, traffic, noise, and the children's safety in an urban environment. As stated earlier, I was looking for a site that would challenge my skills as a designer because the best solutions often come when facing adversity.

In addition to working with the challenging site, the spaces required to meet the needs of a school are also quite challenging, particularly because, having spent the majority of my life thus far in school, I may have had preconceived notions as to what a school was or should be. A solid concept is often the best tool to push design forward when facing challenges.

By requirement of the competition, and good design sense in any case, part of my overall concept was to create an environmentally responsible school. However, as stated earlier I was truly interested in how to create a socially sustainable environment, a place that encourages interaction, collaboration, and pride in the community. Buildings should be first and foremost about the people who will use them. They should strive to create a comfortable environment that will best suit their needs and wishes. Upon researching architecture that I felt to be successful in both the environmental and social realms I developed a few major guidelines for the project.

My first thought on how to design for positive social environment was that the lower levels should contain public and community related spaces like the cafeteria and gym. In this manner I hoped to encourage the public to participate in functions held at the school. Secondly I felt that audio visual connectivity was vital. Allowing students and teachers to see and hear activities occurring elsewhere in the building would promote curiosity and interaction between individual groups. Lastly, flexible spaces

would be important. Spaces that are flexible can be used for any number of activities and events. Spaces could be used for different size groups to meet or for a non-traditional school activity to occur.

Environmentally I was very interested in using a double skin façade system, not only for the environmental impact but also for the visual appeal. I felt that a feature double skin façade could become a signature element of the school that spoke to the spirit of South Lake Union and sustainability at the same time. Going along with the double skin I thought about ways to tackle the potential air pollution problems from around the site. One idea that occurred to me was the use of bio-filters, which is simply filtering air through plant life as a means of cleansing. I felt that this too could become a design feature for the building. The most common sense sustainability principle I wished to employ was daylighting. From the beginning I intended to orient all classroom spaces towards indirect north light. These several principles were the key early design decisions that shaped my project both socially and environmentally.

South Union Elementary School is a place of possibility and opportunity. It is a place designed for the whole of South Lake Union, not just the children, not just their families, but for everyone in the community. Each person that lives nearby, or passes the building on his or her way to work holds a stake in this place.

In order to respond contextually to the community in which the school would exist, the building needed to have an activity or space showcased on each corner so that a maximum visibility is achieved. By showing off what's happening on the inside, the building attempts to entice the public and draw them in as well. Additionally, by having no "back" of the building, the school provides something for future buildings to respond to in their designs. In this manner there can be a dialogue between buildings. If this is done correctly it can translate into a dialogue between people which is the ultimate objective in developing a socially viable community. Overall the school is successful in showcasing a space or activity on each side of the building.

The first thing anyone would look for when coming to a building is how to get into it. The entrance to any public building should be well defined and intuitive to the user. A difficult - to - find entry point would be frustrating and discouraging to someone trying to engage the building and would be the opposite of what is intended in the school design. In the case of South Lake Union Elementary, the entrance has been placed on the east side of the site and is defined by a large overhang, as well as two flanking elements, the protruding music hall, above and to the left, and a monumental LED clock, encasing a stairway to the right. The clock would serve as a primary marker for the entrance as it would be nearly 80 feet tall and visible from far away.

The entrance was placed in this location for a few reasons. First of all, the urban context and traffic flow does not fit well with dropping off school children. The entrance needed to be near the most manageable street, which, after converting to a one way street, is Terry Avenue on the east border. Secondly, public transportation is available along Terry Ave., and promoting the use of public transportation makes sense both socially and environmentally. If parents, students, and community members can utilize the public transportation system in getting to functions held at the school, there will be less need for parking on site or nearby.

After stepping over the threshold, and passing by the administrative suite to the left, a building user would step into an expansive 5 story atrium space. This space is the organizing element to the whole building and it serves more purpose than just that. Almost all spaces in the building overlook or open into this atrium and allows for all these spaces to become visually connected which is important to encouraging curiosity and engagement among groups in the school. With so many students, and grade

levels in one place it is likely that two classes could be studying like subjects at the same time. Being able to see and hear what's going on will allow those groups to relate.

Additionally, the atrium space serves as a daylighting tool. The space has large curtain walls on the east, west and south. At any given point during the day, this central space is well lit. It should be noted that vertical shading devices are employed on the east and west facades, where the direct sunlight can be difficult to control. The south curtain wall is shaded by an overhang.

On the ground floor of the atrium there are a variety of publically inclined spaces. As mentioned before, administration is off to the left, as is the gym and theatre entrance. The right side on the atrium is home to a generous exhibition space and the school cafeteria. The intention of the exhibition space was to provide an area where large amounts of student work could be displayed so that students could learn from the work of their classmates no matter what grade level. The exhibition space could also house work from outside the school. Local artists could be invited to display their work, which would be a service to the students as well as the community. This space is especially flexible because its entire right side wall can be folded up and opened to the plaza and park area outside. By allowing this wall to open, activities inside or outside the building are not restricted to their respective spaces. If it is desired the spaces can flow together. With the entirety of the wall folding away the number of barriers between the two spaces is reduced and a true sense of openness may be accomplished.

Moving further into the atrium on the extreme west end of the school is the cafeteria. This space is open to the atrium and overlooks the play area to the north. Originally it was intended that the cafeteria would overlook the gym and theatre to create a type of after-hours café with direct access to those spaces. In the end the positioning of these spaces did not work together to form such a relationship, although, the cafeteria could still function after hours with direct access to the exhibition space and the outdoors.

Perhaps the most noticeable and dominating element of the atrium is the 3 story bio-filter wall that forms the left edge of the space. This large green wall brings nature directly into the building and carries it vertically to the upper levels. Its effect is not purely visual however. It works in conjunction with the gym's double skin façade system. As air is pulled through the building, as a result of the heating of air inside the double skin, it passes through the bio-filter wall which takes pollutants out of the air. This feature of the building improves the overall atmosphere of the building both physically and psychologically.

Beyond the bio-filter wall is the gym and theatre space. To gain access to this area, users pass through a cased opening in the green wall. In order to keep the gym visible to the outside world, it was depressed 10 feet into the ground. This was done to keep safe, solid walls around the playing surface while still allowing visibility from the street. People passing by can look down into the space to see what is happening. The same is true on the interior side of the gym, where people on the ground and second level can look down into the gym and stage area. Visual access is again encouraging interest in the happenings of the building.

The gym's south facing, double skin façade is a feature of the building. The large glass wall lights the gym while it helps to ventilate the rest of the building. The 6 ft. space between the two layers allowed for vegetation to be placed in the cavity. The vegetation serves as a second bio-filter and also shades the gym from south exposure. Spanning the top of the façade are the words South Lake Union, a call to the community that this is their place.

Immediately at the top of the central staircase is the library. The library was designed to be a very open space and one that students would regularly pass by in their daily routines. Although the library of an elementary many not be the heart of knowledge that a university library is, the symbolism is still strong. This is why the library claims the coveted spot at the top of the grand staircase, which is immediately across from the building entrance. The library is not closed room like so many are. Instead, the library flows openly on the entire west end of the building and is larger than required to accommodate books and materials for public use. The openness of the library is a welcoming feature and seeks to encourage a give and take of idea of information.

Attached to the library is large multipurpose hall. This space is large and double high, making it ideal for many activities. This space is one of the showcased areas of the building as it sits on the south west corner of the site. In designing this space it was thought that it could serve as a rehearsal space for anything that would be performed on the stage below it, a meeting hall for the community or school, or an expansion of the library if that would be needed in the future.

One of the initial design intents for this project was to use indirect daylighting for all of the classroom spaces and to additionally provide each class with a great view of Lake Union. This intent was achieved by placing all of the classrooms oriented northward and stacked on top of each other. Classrooms begin on the second level with kindergarten and 1st grade as well as one special education classroom. Special education classrooms exist in the same spot on levels 2, 3, and 4. The purpose of this is make sure that special education students are not excluded from the school experience and are integrated with most of the grade levels.

The next three levels consist of all classrooms, with the art room on the third level and music , rooms on the 4th and 5th floors. Grade levels are placed in pairs and each floor has at least one break out space where any type or size of group can study. On floors 4 and 5 the breakout space is featured in the center of the building. This space can be seen from the atrium and vice versa. The space on the 5th level is slightly cut back so that it can overlook the space below it. These spaces are ideal for the two grade levels of each floor to work together. The design intent is that these spaces would be comfortably furnished and feature computers, and digital equipment.

The breakout spaces that exist among the classrooms are special places, and they are therefore differentiated from the classrooms on the exterior of the building. The north façade of the school is essentially a simple diagram of the interior functions. Any space that is intended for public or group use is called out. These spaces protrude from the otherwise flat north face and are further highlighted by a bright green color that defines their borders. This is one way to encourage public participation in the school. The activities in which the public might take part in are clearly shown and made known. The individual classrooms on the other hand are a little more private. They are shown on the façade by a checkered glass pattern that varies in both color and translucency. Spaces behind this façade are not as visible and it is not easy to tell what is going on inside of them so it is clear that these spaces are not public.

The building itself was not the only thing designed. The entire site must work together to achieve the desired effects of any design. For South Lake Union Elementary there was a need for green space to play and learn. The compact design of the actual school building allowed for about half the site to be designed as green space. Since there is a park located directly across the street, this half of the site is seen as an extension of that space. People could move freely between the two spaces.

The site design features two main elements, a plaza with an overhead plane for shelter and a large open green space for the students to play. The plaza area begins along the exhibition space's

folding doors, and extends down into the play area. The steps that bridge the 4 ft. depression are large and designed to be seating for a stage placed at the bottom. The large open play area is set into the earth to help contain the students and is lined with trees for shading and an implied barrier when students are using the space.

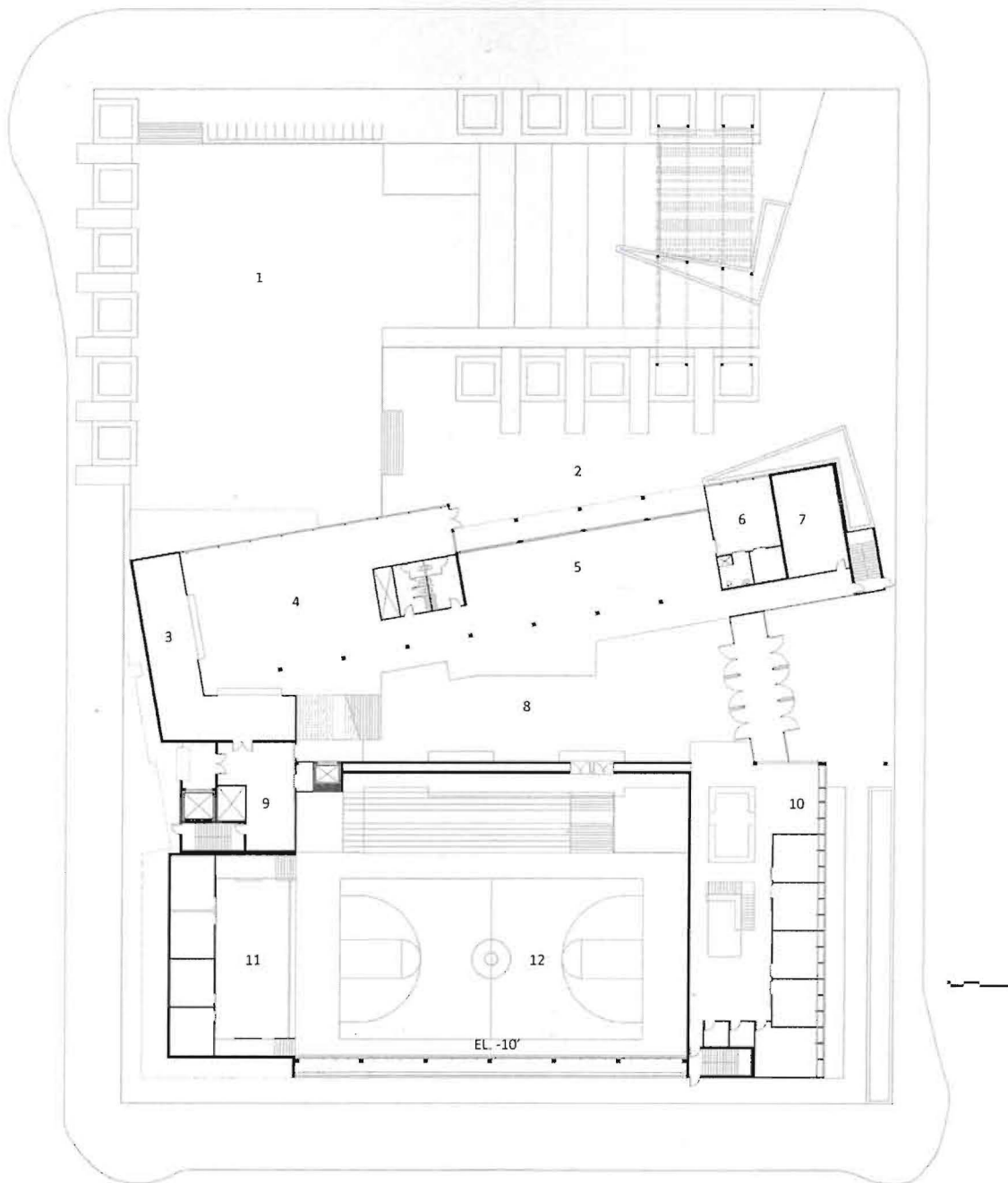
The overall building form was shaped by the desired relationships of spaces and by environmental and contextual considerations. The colors, which may seem outlandish, were inspired by the local sports team's colors. Using something that is already of the place helps to tie the architecture to the site and its surroundings to make people feel at home.

Works Cited

Jaeger, Falk. *Behnisch Architekten*. Berlin: Jovis, 2009. Print.

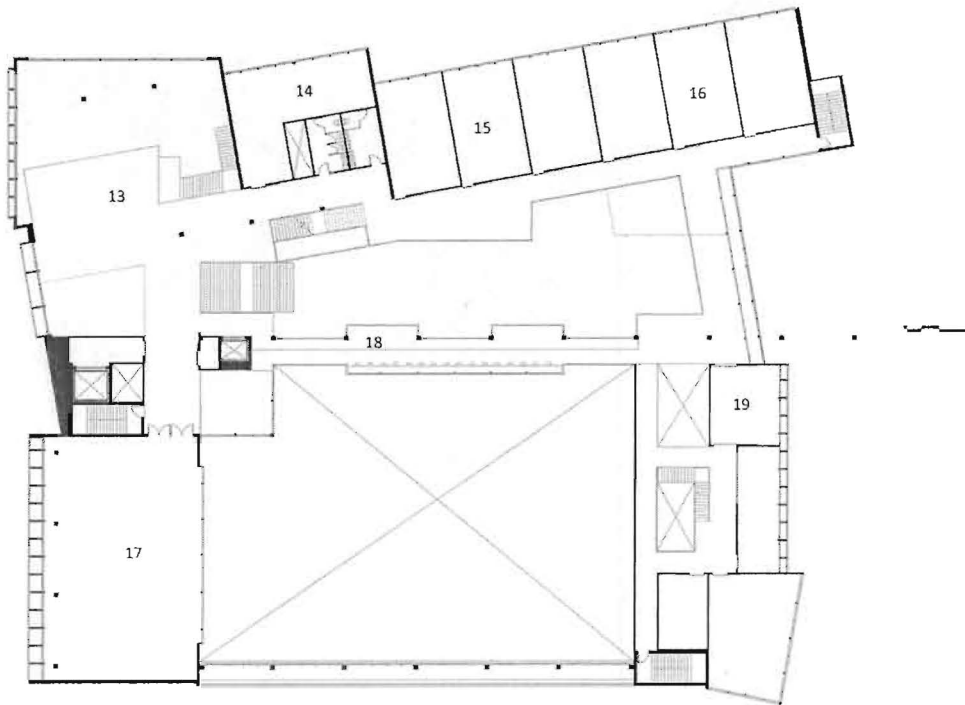
"Seattle Department of Transportation: Mercer Corridor Project." *Seattle.gov Home Page - The Official Web Site for the City of Seattle, Washington*. Web. 09 May 2011.
<http://www.seattle.gov/transportation/mercer_west.htm>.

Appendix A – Presentation Graphics



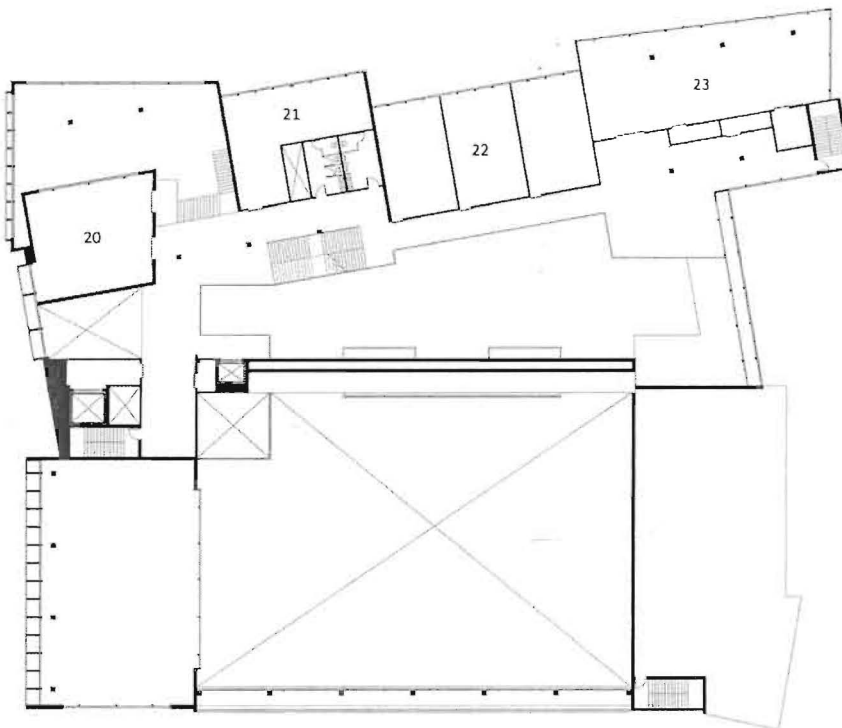
Ground Level

- | | | | |
|--------------|------------|------------|--------------|
| 1. Play Area | 2. Plaza | 3. Kitchen | 4. Cafeteria |
| 5. Clinic | 6. Storage | 7. Atrium | 8. Service |
| 9. Stage | 10. Gym | 11. Stage | 12. Gym |

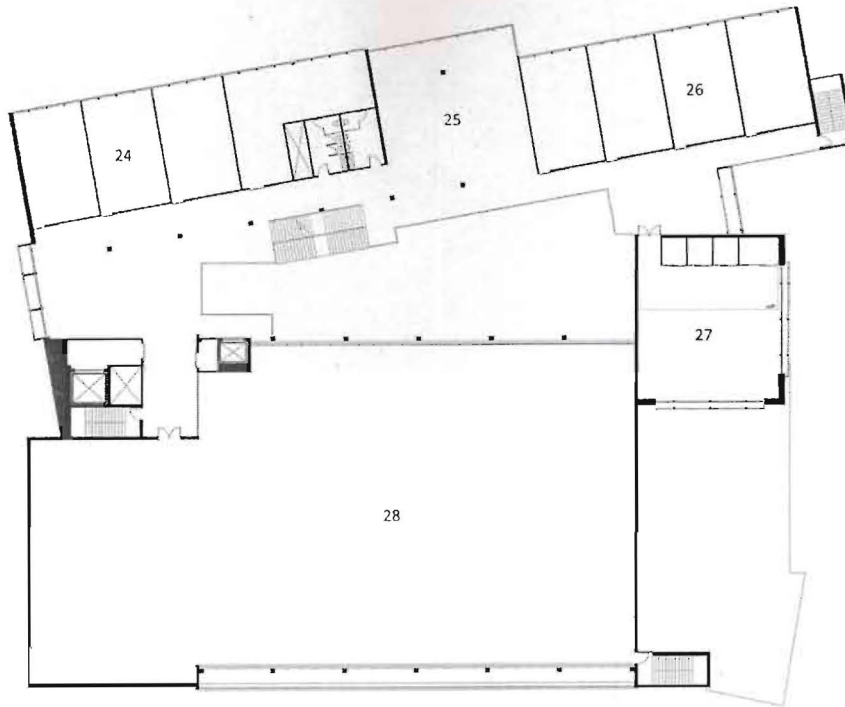


Second Level

- | | | | |
|-------------------|------------------|--------------------|-----------------|
| 13. Library | 14. Special Ed. | 15. Kindergarten | 16. First Grade |
| 17. Multi-Purpose | 18. Lounge | 19. Administration | 20. Tech Room |
| 21. Special Ed. | 22. Second Grade | 23. Art Room | |

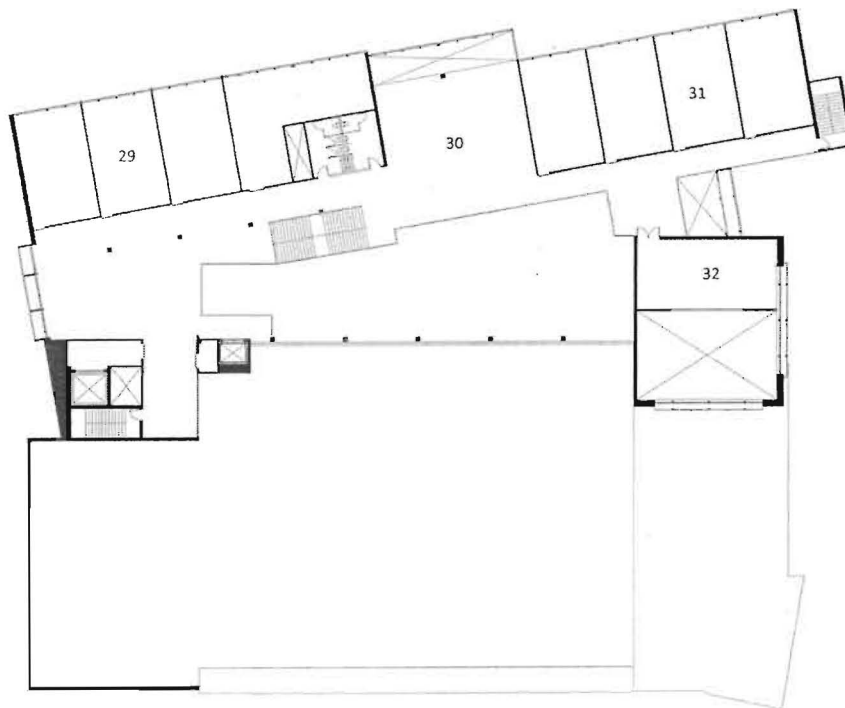


Third Level

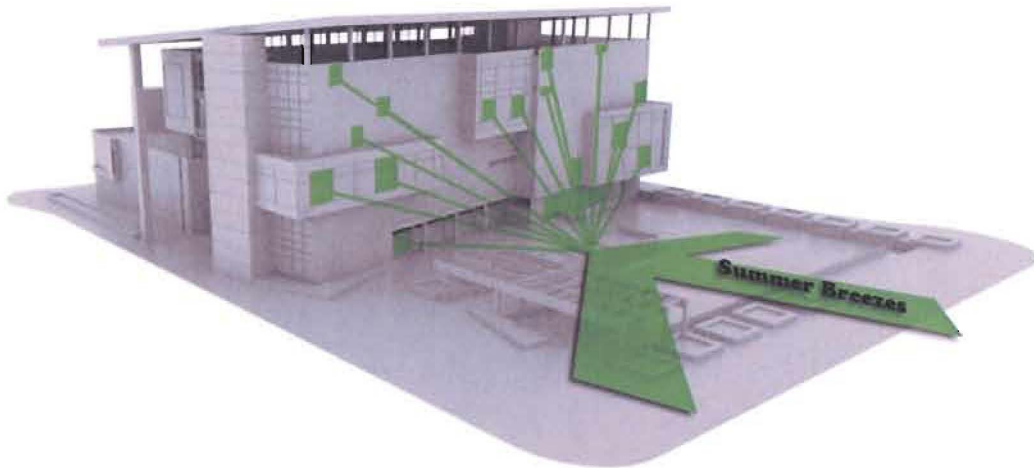


Fourth Level

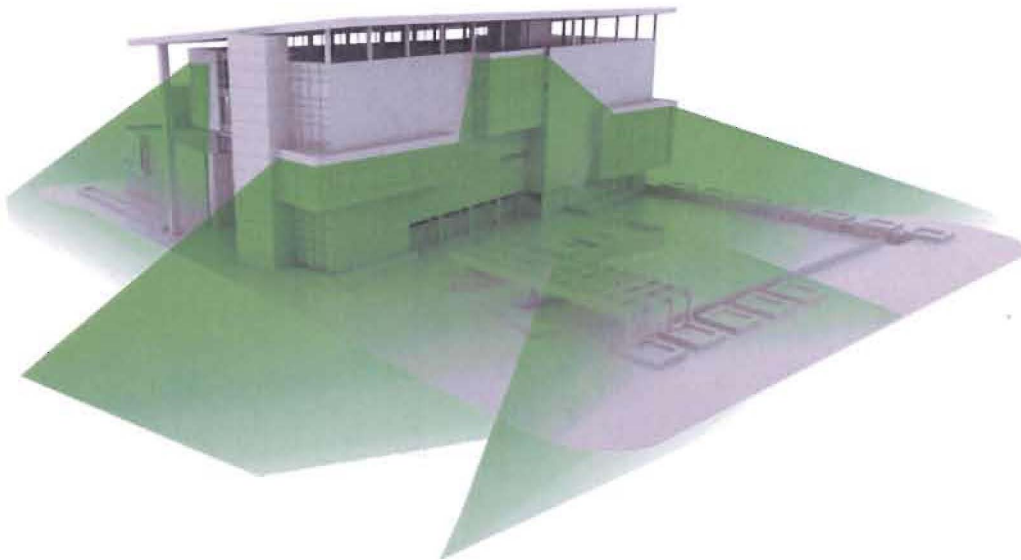
- | | | | |
|-----------------|---------------------|---------------------|-----------------|
| 24. Third Grade | 25. Break Out Space | 26. Fourth Grade | 27. Music Hall |
| 28. Green Roof | 29. Fifth Grade | 30. Break Out Space | 31. Sixth Grade |
| 32. Music Room | | | |



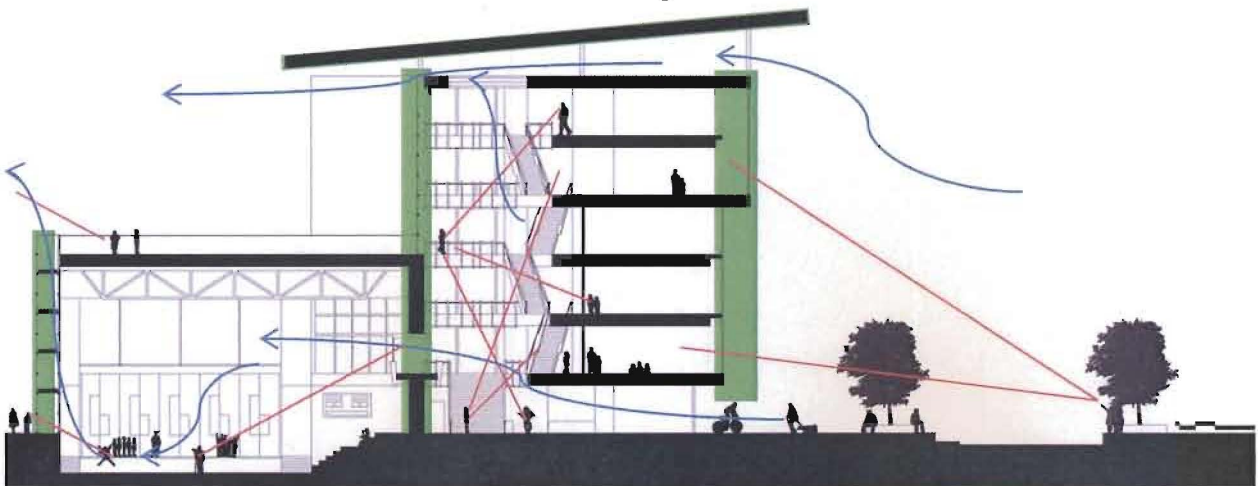
Fifth Level



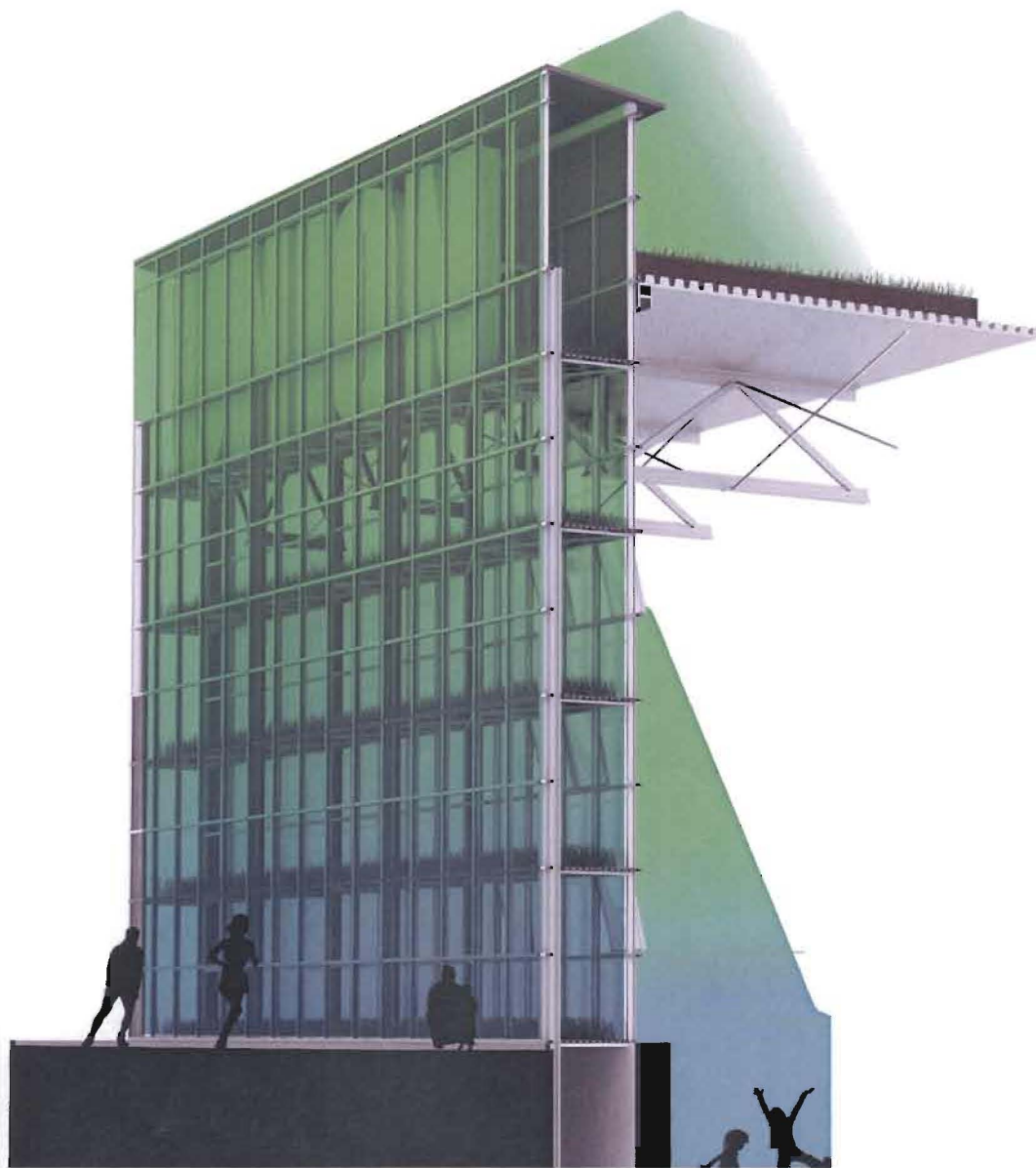
Ventilation Diagram



Views Diagram



Building Section Systems and View Diagram



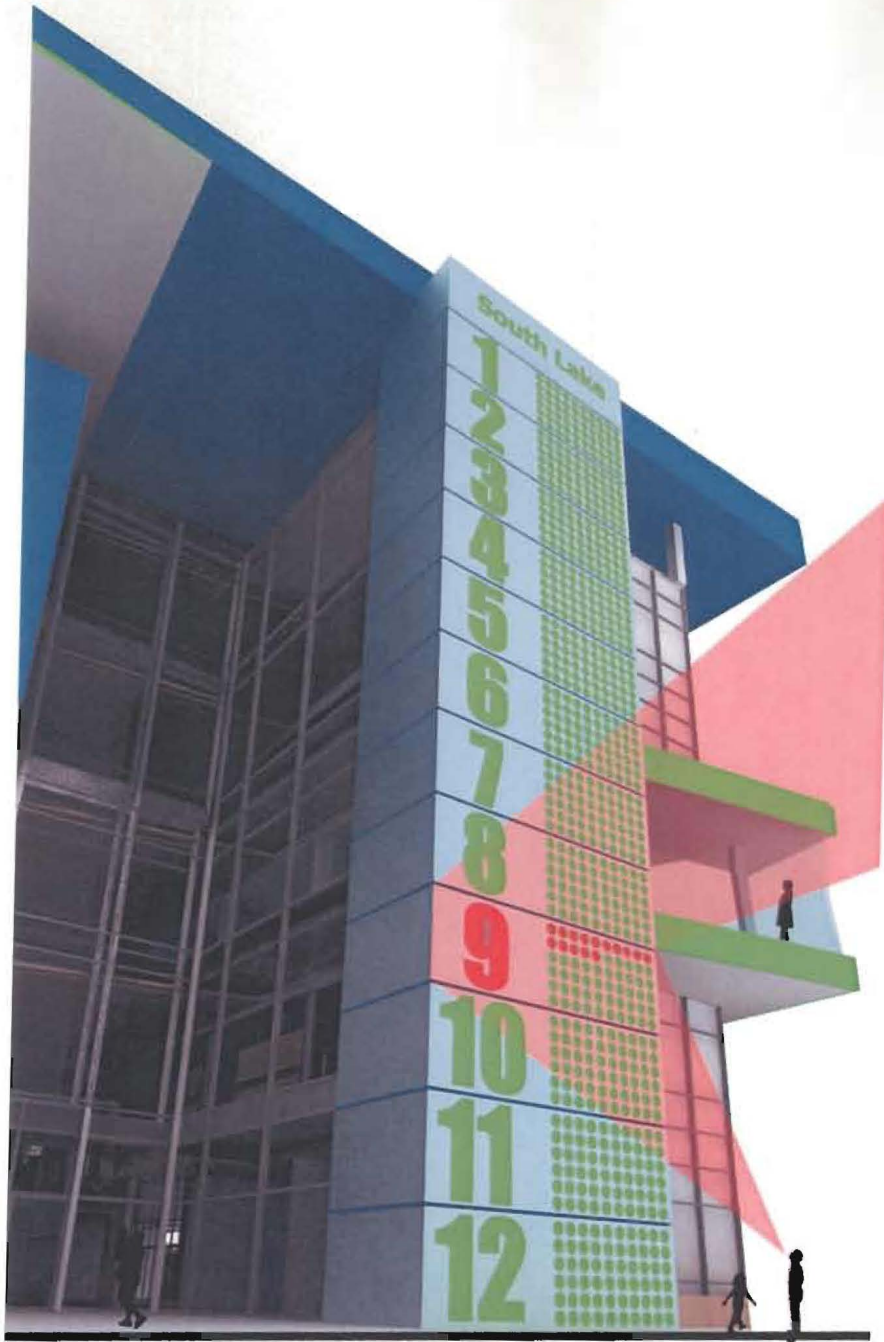
3D Wall Section and Double Skin Façade Diagram



South Lake Union Elementary at Sunset



View from Third Floor Balcony



Proposed Clock Tower



3D Section of Classrooms and Break Out Space



School of Tomorrow: South Lake Union Elementary

Elementary School for Seattle, Washington
A design competition sponsored and funded by
Crigo Architects and Engineers

The schools of the future will be expected to serve a multitude of functions. Not only will the schools be responsible for the education of the youth, but also the education of the community. A school is almost always a focal point in a community, especially one that is rapidly growing and changing. South Lake Union Elementary School strives to be a beacon and a catalyst to build around for the newly developing community just north of downtown Seattle, Washington. In addition to providing a quality educational environment that provides for all types of learning, the school encourages the interaction of students, teachers, and the surrounding community as a whole.

These goals are achieved by creating public spaces that are both visible and accessible. From the exterior of the building the functions of spaces can be read by passersby. Areas where group learning takes place in areas where the public are welcome after hours express themselves by jutting out from the generally flat facade of the building. These areas, such as the library, the art space and the music room project from the corners of the building and have different glass facades from the classroom spaces, which have a checkered glass pattern expressing their semi-private nature. The glazing of activities within the building encourages the interaction of school and community.

Once entering the building the user will notice that all spaces are organized around a large central atrium. The atrium houses multiple purposes as it creates a space common to all levels of the building, allows daylight to penetrate deep into the building, and helps with air flow, up and out of the building. All circulation for the classroom and learning towers originates the edge of the atrium. At certain points on each level there are projections into the atrium that create headroom spaces for the varying grades. Each level has the ability to overlook another which in turn can generate interest in activities occurring elsewhere in the building.

Lake Union



Ground Level



A double skin glass facade allows for adequate daylight and north ventilation of the school. Additionally, not just air is filtered by a series of dynamic filters before it is heated.

The double skin system for the atrium under the facade for better air quality as air enters the building.

Board Layout

Appendix B – Model Photos

